

ABSTRACTS of the 3rd International Conference on Regenerative Orthopaedics and Tissue Engineering

ANIMAL MODELS IN CARTILAGE RESEARCH

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Articular cartilage traumatic injuries and degenerative lesions are leading cause of disability in humans worldwide. Spontaneous healing of articular cartilage is poor and untreated defects predispose to osteoarthritis. The clinical and financial burden of osteoarthritis inspires clinicians and scientist to explore new therapies. Animal models in cartilage repair and regeneration research are widely used to evaluate novel concepts and improve current techniques. Animals commonly used in cartilage research include lapine, murine, canine, porcine, caprine and equine models. Direct injury to the articular cartilage of the used experimental animal, including creation of focal defect, joint destabilization or application of chondrotoxic agents is a common method to induce cartilage loss and osteoarthritis. Limitations related to the model and the translation of the results to the clinical practice should be carefully evaluated and recognized. Rodent and rabbit models are cost and space effective, useful for pilot and proof of concept studies but associated with spontaneous intrinsic healing of articular cartilage greater than in humans and large animal models. The small size of their joints especially thin articular cartilage, limit the types of treatment options and translational potential. Large animal models with thicker articular cartilage and larger joints, address many of the limitations associated with rodent and rabbit models. Healing potential of the cartilage in large animals is comparable with that seen in humans. Post-operative manipulation, particularly in dogs, like application of bandages, braces, limited weight-bearing and physical therapy can mimic various options used in human medicine. Besides, spontaneously occurring cartilage defects in client owned dogs and horses provide important data in assessments of different treatment strategies. No animal is ideal for every type of investigation in cartilage research. Anatomy, maturity and joint biomechanics and cost effectiveness must be taken into account. Comprehensive analysis of each species characteristics should be conducted in order to address the main research questions. Large animal models like dogs, sheep, goats and horses are necessary for translational research aimed at gaining regulatory approval for safe and effective clinical use in humans.